

UNDERSTANDING OLIGACTIS (ASTERACEAE: LIABEAE): THE TRUE IDENTITY OF *O. SESSILIFLORA* AND *O. VOLUBILIS*

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ABSTRACT

The neotropical genus *Oligactis* contains 13 species grouped in two subgenera: *Andromachiopsis* and *Oligactis*. Subgenus *Oligactis* has four species that occur mainly in Colombia and one of them reaches Central America and Venezuela. New synonyms *Oligactis garcia-barrigae* and *O. valeri* are proposed under the species *O. volubilis* and *O. sessiliflora*, respectively. The synonyms *Liabum meridense*, *O. biattenuata*, and *O. boyacensis* are transferred from *O. volubilis* to *O. sessiliflora*. *O. volubilis* is illustrated for the first time. In addition, a key to the species of the subgenus *Oligactis* is provided.

KEY WORDS: Asteraceae, Colombia, Compositae, Liabeae, *Oligactis sessiliflora*, *O. volubilis*

RESUMEN

El género neotropical *Oligactis* contiene 13 especies agrupadas en dos subgéneros: *Andromachiopsis* y *Oligactis*. El subgénero *Oligactis* incluye cuatro especies distribuidas principalmente en Colombia, de las cuales una alcanza América Central y Venezuela. Se proponen a *Oligactis garcia-barrigae* y *O. valeri* como sinónimos de las especies *O. volubilis* y *O. sessiliflora*, respectivamente. Se transfieren los sinónimos *Liabum meridense*, *O. biattenuata* y *O. boyacensis* de *O. volubilis* a *O. sessiliflora*. Se ilustra a *O. volubilis* por primera vez. Además, se provee una clave para reconocer a las especies del subgénero *Oligactis*.

PALABRAS CLAVE: Asteraceae, Colombia, Compositae, Liabeae, *Oligactis sessiliflora*, *O. volubilis*

Oligactis (Kunth) Cass. contains 13 species confined to cloud forests from western Venezuela to northern Peru and one species only that reaches forests of Panama and Costa Rica (Dillon & Sagástegui Alba 1994; Funk et al. 1996). *Oligactis* is distinct among Liabean genera by its scandent or climbing habit, pinnatinerved leaves, capitula grouped in axillary or terminal capitulescences, and glandular cypselsae. A modern view of *Oligactis* was provided by Robinson (1983) who illustrated the first evolutionary tree for Liabeae. Phylogenetic analyses based on morphological characters suggested that *Oligactis* is closely related to *Liabum* Adans. (Bremer 1994; Funk et al. 1996; Gutiérrez 2004). On the other hand, in a preliminary phylogenetic study conducted using sequences of the internal transcribed spacer (ITS) 1 and 2 and the 5.8S gene, *Oligactis* was sister to and closely related to the natural group formed by *Dillandia* Funk & H. Rob. and *Liabum* (Gutiérrez et al. 2007).

Originally, *Oligactis* was described by Kunth (1818) as a section of genus *Andromachia* Humb. & Bonpl. (currently a synonym of *Liabum*) with three species: *Andromachia nubigena* Kunth, *A. sessiliflora* Kunth, and *A. volubilis* Kunth. Years later, Bentham (1873) included the species of *Oligactis* in *Liabum* s.l. section *Oligactis*. During a hundred years, this general point of view of *Liabum* was followed by different authors (i.e. Hoffmann 1897; Blake 1927) with only Rydberg (1927) and Cabrera (1954) recognizing separate genera with the general characters of *Liabum*.

In 1964, Aristeguieta recorded six species of *Liabum* s.l. from Venezuela, among them *L. sessiliflorum* (Kunth) Less. and *L. volubile* (Kunth) Less. However, some features indicated by Aristeguieta in *L. volubile* did not fit with its original description. Subsequent check-lists followed Aristeguieta (Badillo 1996; Badillo 2001).

In 1974 Robinson and Brettell resurrected *Oligactis* and created two subgenera: *Andromachiopsis* and *Oligactis*. Also, they transferred several species originally described under the broad concept of *Liabum* to

Oligactis, most of them to subgenus *Andromachiopsis*. According to those authors, subgenus *Oligactis* included eight species: the three species described by Kunth (1818) under *Andromachia* section *Oligactis*, plus *O. biattenuata* (Rusby) H. Rob. & Brettell, *O. boyacensis* (Cuatrec.) H. Rob. & Brettell, *O. latifolia* (Hieron.) H. Rob. & Brettell, *O. mikanioides* (S.F. Blake) H. Rob. & Brettell, and *O. valeri* (Standl.) H. Rob. & Brettell. Then, Robinson (1983) recognised six species under subgenus *Oligactis* since he excluded *O. nubigena* (Kunth) Cass., noticed *O. biattenuata* and *O. boyacensis* as synonyms, and cited the last species described *O. garcia-barrigae* H. Rob. (Robinson 1980). He hypothesized this subgenus included the most specialized element of the genus *Oligactis* due to its axillary or terminal capitulescence, six to 10 florets per capitulum, and papillose anther apical appendages.

In spite of floristic treatments and check-lists from Costa Rica (Standley 1938), Ecuador (Robinson 1978; Robinson 1999), Peru (Dillon & Hensold 1993), and Venezuela (Aristeguieta 1964; Badillo 2001), a revision of *Oligactis* has not been made. While performing a revision of the genus *Liabum* (Gutiérrez 2004), species belonging to *Oligactis* subgenus *Oligactis* have been studied. The object of this work is to determinate the real taxonomic identity and synonyms of *O. sessiliflora* (Kunth) DC. and *O. volubilis* (Kunth) Cass.

MATERIALS AND METHODS

The morphological and taxonomic studies were based on specimens, photos and/or digital images kept at GH, K, LP, NY, P, SI, MO, US, and VEN. The data derived from the specimens were supplemented by information from the literature. For microscopic examination, vegetative and reproductive parts were rehydrated, treated with a clearing process, stained with 2% safranin, and mounted on microscope slides. Drawings were made using an Olympus CH2 microscope with camera-lucida.

RESULTS AND DISCUSSION

The status of *Oligactis volubilis*

In the protologue, Kunth (1818) distinguished of *Andromachia volubilis* (currently *O. volubilis*) by its scandent habit, lanceolate-linear leaves, and pedunculate capitula in terminal panicles with approximately six florets per capitulum, and *A. sessiliflora* (currently *O. sessiliflora*) by its shrubby habit, oblong leaves (and ovate, according to the original illustration), axillary and terminal panicles, and sessile and densely grouped capitula with approximately eight florets per capitulum. In spite of several traits in common, both species can be easily distinguished (Table 1).

Aristeguieta (1964) under the broad concept of *Liabum* first treated *Liabum meridense* Badillo as a synonym of *L. volubile* based on the specimens Gehriger 427 (type of *L. meridense*) and Badillo 613. In his description, he characterized *L. volubile* by its lanceolate leaves (2–4 cm wide), pedunculate capitula, and 10–15 florets per capitulum. However, all the specimens studied by Aristeguieta seem to belong to *O. sessiliflora* because none of the specimens analysed had narrowly elliptical or linear leaves, the most conspicuous trait of *O. volubilis*. On the other hand, he characterized *L. sessiliflorum* by its elliptical to lanceolate leaves (2.5–6 cm wide), sessile to slightly pedunculate capitula, and approximately 10 florets per capitulum. According to this author both *O. volubilis* and *O. sessiliflora* would share almost the same lamina width and amount of florets per capitulum.

In 1980, Robinson described *O. garcia-barrigae* which was distinguished from *O. volubilis* (and *O. sessiliflora*) by its narrow leaves, often closely spaced or clustered on lateral branches, and six florets per capitulum (three ray and three disc florets). However, my analysis revealed that the type specimens of *O. garcia-barrigae* are strikingly similar to the type of *Oligactis volubilis* (Fig. 1). The specimens of both taxa share the following combination of characters: narrowly elliptical or lineal leaves, densely grouped capitula in axillary panicles, and approximately six florets per capitulum (commonly three ray and three disc florets). Thus, *O. garcia-barrigae* is proposed as a synonym of *O. volubilis*.

On the other hand, Robinson (1983) included the Colombian species *Oligactis biattenuata* and *O. boyacensis* described by Rusby and Cuatrecasas respectively, under *O. volubilis* and maintained the concept

TABLE 1. Characters in *Oligactis sessiliflora* and *O. volubilis*.

Character	<i>O. sessiliflora</i> (Kunth) DC.	<i>O. volubilis</i> (Kunth) Cass.
Leaf arrangement	Decussate, not grouped on nodes	Decussate, densely grouped on nodes
Lamina shape	Elliptical or ovate, sometimes narrowly	Narrowly elliptical or linear
Lamina width	2 cm to 6 cm	0.1 cm to 0.5 cm
Lamina margin	Subentire or serrulate	Entire
Leaf margin intrasection	Planate	Revolute
Capitulescence	Axillary and terminal paniculiform or glomerate racemiform cymes	Axillary and terminal paniculiform cymes
Involucre	Sessile or slightly pedunculate	Slightly pedunculate
Ray florets	3 to 6	3
Disc florets	7 to 9	3

of Aristeguieta regarding *Liabum meridense* as synonym of the last species (*O. volubilis*). However, both Colombian’s species (*O. biattenuata* and *O. boyacensis*) and *L. meridense* fit strickly with *O. sessiliflora* specially regarding leaf shape, quantity of florets per capitulum, and ratio between ray and disc florets. Therefore, the illustration of *O. volubilis* (Robinson 1983) actually represents *O. sessiliflora*. According to the findings above described, *L. meridense*, *O. biattenuata*, and *O. boyacensis* are excluded from *O. volubilis*.

Oligactis volubilis (Kunth) Cass., in F. Cuvier, Dict. sci. nat., ed. 2, 36:17. 1825. (**Fig. 2**). *Andromachia volubilis* Kunth, in Humboldt, Bonpland & Kunth, Nov. gen. sp., ed. Folio, 4:80. 1818. TYPE: Probably COLOMBIA. Department and locality uncertain: *crescit in monte Antisana Quitensium?*, *Humboldt & Bonpland s.n.* (HOLOTYPE: P [digital image LP!]) (see discussion below). *Diplostephium volubile* (Kunth) Spreng., Syst. veg. 3:543. 1826. *Liabum volubile* (Kunth) Less., Linnaea 6:704. 1831.

Oligactis garcia-barrigae H. Rob., Phytologia 46:100. 1980. Syn. nov. TYPE: COLOMBIA. Cundinamarca-Meta: Cordillera Oriental, vertiente occidental, Fómeque, camino al Lago de Chingaza y cordillera de Cerro Verde, 1900–3200 m, 26–28 Dec 1962, *García-Barriga* 17689 (HOLOTYPE: COL; ISOTYPES GH!, US [digital image LP!]).

The Antisana (currently Antizana) mountain (Ecuador) was cited by Kunth (1818) with doubt as the original locality of *Andromachia volubilis*. In addition, the holotype kept at P does not have any data of the locality and there are no additional type materials of this species. Robinson (1999) understood the locality cited by Kunth was a mistake and excluded *Oligactis volubilis* from Ecuador. Thus, Colombia is probably the country where the type was collected by Humboldt and Bonpland, since the specimens assigned to *O. volubilis* from Costa Rica (Standley 1938), Panama (Robinson 1999) and Venezuela (Aristeguieta 1966), actually belong to *O. sessiliflora*. On the other hand, the synonym *O. garcia-barrigae* proposed in this work was collected in central Colombia and its types currently represent the unique materials of *O. volubilis* with reliable data of collection area.

The status of *Oligactis sessiliflora*

The analysis revealed that the type specimens of *Liabum meridense*, *Oligactis biatenuatta*, *O. boyacensis* (excluded in this work from *O. volubilis*), and *O. valeri* match *Oligactis sessiliflora*. The specimens of those taxa share the following combination of characters: elliptical, ovate or sometimes narrowly ovate leaves, densely grouped capitula in axillary and terminal panicles or glomerate racimous cymes, sessile or slightly pedunculate capitula, and eight to 15 florets per capitulum. Thus, *L. meridense*, *O. biatenuatta*, *O. boyacensis*, and *O. valeri* are proposed as synonyms of *O. sessiliflora*.

Oligactis sessiliflora (Kunth) DC., Prodr. 5:96. 1836. *Andromachia sessiliflora* Kunth, in Humboldt, Bonpland & Kunth, Nov. gen. sp., ed. Folio, 4:80. 1818. TYPE: Probably COLOMBIA. Department and locality uncertain: *crescit in Regno Peruviano?* *Humboldt & Bonpland s.n.* (HOLOTYPE: P [photos LP!, SI!]; ISOTYPE: B [photo FM 18129, SI!], probably destroyed). *Oligactis apodocephala* Cass., in F. Cuvier, Dict. sci. nat., ed. 2, 36:17. 1825. *Diplostephium sessiliflorum* (Kunth) Spreng., Syst. veg. 3:543. 1826. *Liabum sessiliflorum* (Kunth) Less., Linnaea 6:703. 1831. *Oligactis sessiliflora* (Kunth) H. Rob. & Brettell, Phytologia 28:58. 1974.



FIG. 1. A. *Andromachia volubilis* (holotype, P). B. *Oligactis garcia-barrigae* (isotype, GH).

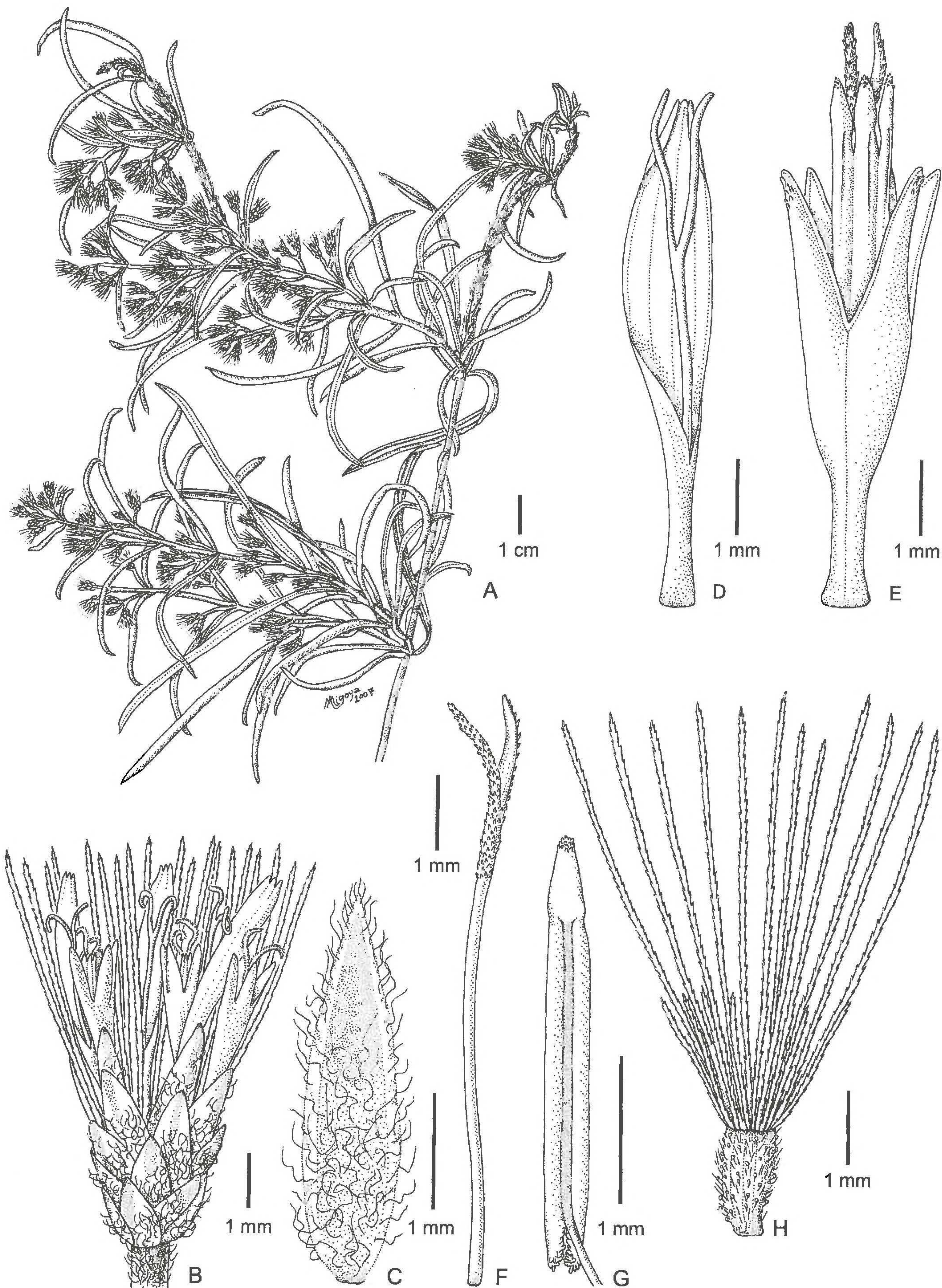


FIG. 2. *Oligactis volubilis*. A. Habit. B. Capitulum. C. Involucral bract. D. Ray floret. E. Disc floret. F. Style of disc floret. G. Anther. H. Cypselas and pappus (García-Barriga 17689, GH).

Liabum towarensense V.M. Badillo, Bol. Soc. Venez. Ci. Nat. 10:314. 1946. TYPE: VENEZUELA. ARAGUA: Colonia Tovar, 1800–2000 m, Dec 1942, *Allart* 370 (HOLOTYPE: VEN [digital image LP!]; ISOTYPE: US [digital image LP!]).

Liabum biattenuatum Rusby, Descr. S. Amer. pl.:159. 1920. Syn. nov. TYPE: COLOMBIA. MAGDALENA: Santa Marta, Sierra del Líbano, 5500 ft, 19 Jan. 1898/1899, *Smith* 2013 (HOLOTYPE: NY [digital image LP!]; ISOTYPES: K, MO, P [photos LP!, SI!], S, US [digital image LP!]).

Oligactis biattenuata (Rusby) H. Rob. & Brettell, Phytologia 28:57 1974.

Liabum boyacense Cuatrec., Revista Acad. Colomb. Ci. Exact. 6:61. 1944. Syn. nov. TYPE: COLOMBIA. BOYACÁ: Cordillera Oriental, entre Moniquirá y Arcabuco, 2150 m, 25 Feb 1940, *Pérez Arbeláez & Cuatrecasas* 8164 (HOLOTYPE: COL; ISOTYPES NY [digital image LP!], US [digital image LP!]).

Oligactis boyacensis (Cuatrec.) H. Rob. & Brettell, Phytologia 28:57. 1974.

Liabum meridense V.M. Badillo, Bol. Soc. Venez. Ci. Nat. 10:314. 1946. Syn. nov. TYPE: VENEZUELA. MÉRIDA: Tabay, selva de la Isla y El Rincón, 2500–2700 m, 8 Sep 1930, *Gehriger* 427 (HOLOTYPE: VEN [digital image LP!]; ISOTYPE US [digital image LP!]).

Liabum valeri Standl., Publ. Field Mus. Nat. Hist., Bot. Ser. 18:1490. 1938. Syn. nov. TYPE: COSTA RICA. SAN JOSÉ: Near Finca La Cima, above Los Lotes, N of Copey, 2100–2400 m, 21/22 Dec 1925, *Standley* 42555 (HOLOTYPE: F; ISOTYPE: US [digital image LP!]).

Oligactis valeri (Standl.) H. Rob. & Brettell, Phytologia 28:58. 1974.

Iconography.—Kunth 1818, tab. 338; Robinson 1983: 40, fig. 9 (sub nom. *Oligactis volubilis*).

Candolle (1836) recognized under *Andromachia* the three species of Kunth’s section *Oligactis*. In the synonymic list he assigned the combination *Oligactis sessiliflora* to Cassini. However, Cassini never made this combination because he created the superfluous name *O. apodocephala* (Cassini 1825). Recently, Robinson and Brettell (1974) made the combination *Oligactis sessiliflora*. Nevertheless, according to The International Code of Botanical Nomenclature (ICBN), Art. 33.1, 2, and 4, the valid combination was made by Candolle.

The current four species of *Oligactis* subgenus *Oligactis* can be distinguished as follows:

- 1. Leaf lamina linear to narrowly elliptical, margins entire; capitulum usually 6-flowered_____ **O. volubilis**
- 1. Leaf lamina elliptical to ovate, margins subentire or serrulate; capitulum of (8–)10–15 florets.
- 2. Leaf adaxial surface hirsute_____ **O. latifolia**
- 2. Leaf adaxial surface glabrous.
- 3. Sessile or subsessile capitula densely grouped in panicles or glomerate racemes_____ **O. sessiliflora**
- 3. Pedunculate capitula laxly grouped in panicles_____ **O. mikanioides**

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